~~11986~~

BY THE COMPTROLLER GENERAL

115111

Report To The Congress

OF THE UNITED STATES

Millions Of Dollars Could Be Saved By Implementing GAO Recommendations On Environmental Protection Agency Programs

Over the past 4 years, GAO has made recommendations on the water pollution control and hazardous and solid waste programs managed by the Environmental Protection Agency which, if implemented, would result in substantial savings and improved program operations. Legislative changes are needed to implement most of these recommendations.

The recommendations on the $35 billion water pollution control program are based on the general theme that wastewater treatment plants that do not significantly improve water quality or that are too costly in relation to benefits should not be built. The Clean Water Act, however, requires specific levels of treatment, regardless of whether the water quality improves or the water uses change as a result of the required treatment.

GAO also recommended fee systems to underwrite hazardous waste program costs and greater emphasis on using combined disposal for sewage sludge and garbage wastes.

115111

CED-81-92
MAY 5, 1981

Has Form 4 8

CED-81-92

Request for copies of GAO reports should be sent to:

U.S. General Accounting Office
Document Handling and Information
Services Facility
P.O. Box 6015
Gaithersburg, Md. 20760

Telephone (202) 275-6241

The first five copies of individual reports are free of charge. Additional copies of bound audit reports are $3.25 each. Additional copies of unbound report (i.e., letter reports) and most other publications are $1.00 each. There will be a 25% discount on all orders for 100 or more copies mailed to a single address. Sales orders must be prepaid on a cash, check, or money order basis. Check should be made out to the "Superintendent of Documents".

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-202928

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses opportunities to realize substantial savings through legislative and administrative changes in the Environmental Protection Agency's water pollution control and hazardous and solid waste programs. The changes we are recommending have been presented in our prior reports to the Congress but have not been acted upon. We believe these recommendations warrant further consideration as the Congress and the administration seek ways to reduce Federal spending and the budget deficit and to control inflation.

The Congress will need to amend existing laws to implement the recommendations that would result in the greatest savings. We will assist the Congress in preparing any necessary legislation, if requested.

BACKGROUND

The Environmental Protection Agency's (EPA's) basic mission is to mount an integrated, coordinated attack on the environmental problems of air and water pollution, solid waste management, toxics, pesticides, radiation, and noise. Above all, EPA is a regulatory agency responsible for setting and enforcing the environmental standards specified in congressional statutes.

EPA administers stringent Federal laws designed to protect human health and the environment--the Clean Air Act, the Clean Water Act, the Noise Control Act, the Safe Drinking Water Act, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act.

In fiscal year 1981, EPA received appropriations of $4.75 billion. The largest EPA program--the water pollution control program authorized by the Clean Water Act--was appropriated $3.4 billion in fiscal year 1981. Since 1972 the program has received appropriations of $35 billion. Hazardous and solid waste programs authorized by the Resource Conservation and Recovery Act have been funded at $242.5 million through fiscal year 1980, and $154.7 million is estimated to be expended during fiscal year 1981.

We obtained information from EPA on the actions it took on 270 of our recommendations contained in 46 reports issued from February 1977 to September 1980 and evaluated the adequacy of these actions. We also reviewed recent legislation and the status of legislative proposals to determine the progress in implementing recommendations we made to the Congress.

Because this analysis showed that the greatest potential for savings is in the water pollution and hazardous and solid waste programs, this report focuses on the recommendations to the Congress and to EPA on these two programs.

Appendix I discusses five reports on the water pollution control program, and appendix II discusses two reports on the hazardous and solid waste program.

We did not obtain written comments from EPA on the matters discussed in this report, as EPA had previously responded to the recommendations.

MILLIONS OF DOLLARS COULD BE SAVED BY IMPLEMENTING RECOMMENDATIONS ON WATER POLLUTION CONTROL PROGRAMS

The five reports on the water pollution program contain recommendations which, if implemented, would substantially reduce Federal expenditures. The reports, issued over the past 3 years, have a common theme--wastewater treatment projects that do not significantly improve water quality or that are too costly in relation to benefits should not be built.

EPA currently projects wastewater treatment needs at about $120 billion by the year 2000. The amount of savings cannot be measured specifically because the level of treatment needed must be determined on a case-by-case basis. If the Congress, however, had allowed a waiver of the secondary treatment requirement in the St. Louis area, as explained below, $163 million could have been saved.

These five reports dealt with mandatory secondary treatment requirements, the need for advanced waste treatment, the high cost of projects to correct combined sewer overflow problems, and chlorination treatment of plant effluents.

The reports concluded that the current legislation can result in constructing projects that have only a marginal impact on water quality. Our May 1978 report on secondary treatment in the St. Louis area showed that constructing $163 million in facilities to obtain secondary treatment would not significantly improve the Mississippi River's water quality or uses. The Clean Water

Act, however, requires that secondary treatment facilities be built. Similarly, our July 1980 report showed that advanced waste treatment (which removes some pollutants left after secondary treatment) with few exceptions, may not be justified because the treatment might not make a substantial difference in water quality. In both reports, we recommended that the Congress amend the Clean Water Act to give EPA more flexibility to consider the impact of the secondary or advanced treatment on water quality before requiring costly treatment facilities to be built.

The enormous amount of funds required for the large construction projects to curb pollution caused by sewer overflows and flooding was the subject of reports in May 1979 on Chicago's Tunnel and Reservoir Plan and in December 1979 on the Combined Sewer Program in 15 U.S. cities. Because neither the Federal Government nor local communities can supply the $88 billion needed to stem the pollution and flooding, we recommended actions by the Congress and EPA to encourage the use of less expensive measures, referred to as "best management practices."

Chlorine use has been found harmful to aquatic life. In 1976, EPA removed a bacterial limitation from its definition of secondary treatment, a limitation that effectively required the year-round use of chlorine. However, many States still required chlorine use because they were uncertain whether EPA's change would affect the States' ability to meet the congressionally mandated 1983 swimming goal. We recommended that the Congress change the Clean Water Act to permit exceptions from the national goal and a revision in EPA's water quality criteria for fecal coliform bacteria to recognize seasonal variations.

SAVINGS AVAILABLE IF RECOMMENDATIONS ARE IMPLEMENTED ON HAZARDOUS AND SOLID WASTE PROGRAMS

Adopting our recommendations in two 1979 reports in the hazardous and solid waste program area would reduce Federal financing to control hazardous waste disposal and to dispose of garbage and sewage sludge. EPA has not aggressively followed through to implement the recommendations. Congressional attention, direction, and emphasis is now needed.

Our review of the hazardous waste management programs showed that neither EPA nor the States had the staff and funds to effectively operate and manage them. The Congress only provided EPA with limited funds for State program implementation. Many States said that without such assistance, they could not accept responsibility for implementing the Resource Conservation and Recovery Act as the Congress directed.

In such cases, EPA must operate the States' hazardous waste programs. Self-supporting programs that charge for waste disposal--such as fee systems--would encourage States to accept their program responsibilities and reduce States' dependence on Federal funding. They would also eliminate the need for Federal as well as State general revenue support for hazardous waste programs. In States where EPA would be required to operate State hazardous waste programs, fee systems could be used to underwrite EPA program costs. Although acknowledging the validity of the fee concept to operate hazardous waste programs, EPA has not aggressively pursued its implementation.

Our report on codisposal of garbage and sewage sludge described the growing problem of disposing of increased quantities of sewage sludge and garbage. Combined disposal, or codisposal, of sludge and garbage by burning is a logical solution. Although more data based on operating experience is needed, some forms of codisposal appear environmentally safe and economically sound. Many factors, including institutional and financing problems, have tended to limit codisposal in the United States. We recommended that EPA encourage and facilitate more widespread consideration of codisposal.

CONCLUSIONS

Millions of dollars in savings and improved program operations would result from implementing our recommendations on the water pollution control and hazardous and solid waste program. The recommendations that would produce the most substantial savings affect the water pollution control program and would require changes to the Clean Water Act. In view of the continuing emphasis on reducing the budget deficit, controlling inflation, and improving the benefits from Federal expenditures, the Congress needs to give strong consideration to the recommendations.

Each of the recommendations we made to the Congress is stated below with references to the pertinent pages of the appendixes. Recommendations we made to the EPA Administrator are stated in the appendixes.

RECOMMENDATIONS TO THE CONGRESS

We recommended that the Congress:

--Amend the Clean Water Act to eliminate the mandatory requirement for secondary treatment of discharges to fresh water and to permit the EPA Administrator to grant waivers, deferrals, or modifications to this requirement when the dischargers can demonstrate that the environmental impact of secondary treatment will be minimal or insignificant. (See app. I, p. 2.)

--Consider several alternatives that would give EPA the flexibility to consider costs more closely in justifying advanced waste treatment projects. (See app. I, p. 6.)

--Amend the Clean Water Act to

  --allow for increased flexibility in meeting water quality goals in those cases where it is determined that the cost to achieve such goals is prohibitive;

  --allow EPA to fund lower cost, nonstructural, or limited structural techniques that cannot be funded under current legislation and that are not normally considered operating and maintenance costs; and

  --permit Federal funding of flood projects when (1) the flooding is caused by combined sewer systems and (2) the solution is part of a total approach designed to minimize both pollution and flooding in the combined system. (See app. I, p. 10.)

--Amend the Clean Water Act to permit exception from the national goal of swimmable waters to recognize those situations in which waters are determined to be unswimmable because of other factors, such as heavy barge traffic, cold seasons of the year, and general appearance. (See app. I, p. 13)

- - - -

We are sending copies of this report to the Director, Office of Management and Budget; the appropriate congressional oversight and appropriation committees and subcommittees; and the Acting Administrator, Environmental Protection Agency.

Milton J. Socolar

Acting Comptroller General
of the United States

Contents

ABBREVIATIONS

AWT	advanced waste treatment
EPA	Environmental Protection Agency
POTW	publicly owned treatment works
RCRA	Resource Conservation and Recovery Act

APPENDIX I

MILLIONS OF DOLLARS COULD BE SAVED BY IMPLEMENTING RECOMMENDATIONS ON WATER POLLUTION CONTROL PROGRAMS

SECONDARY TREATMENT REQUIREMENT SHOULD BE MODIFIED

Our report entitled "Secondary Treatment of Municipal Wastewater in the St. Louis Area--Minimal Impact Expected" (CED-78-76, May 12, 1978) questioned the reasonableness of the Clean Water Act's requirement for secondary treatment when water quality improvement resulting from that treatment level is negligible. We recommended that the Clean Water Act be amended to eliminate the mandatory secondary treatment requirement when dischargers can demonstrate that the environmental impact of secondary treatment will be minimal or insignificant. Such an amendment would substantially reduce the Federal funds needed to build treatment facilities and would reduce energy and sludge removal/treatment costs.

Background

Our 1978 report examined the planned expenditures of $163 million in Federal funds for secondary treatment projects in the St. Louis, Missouri, area. We concluded that (1) the projects would only minimally improve the water quality of the Mississippi River and (2) the limited funds available for building treatment facilities should be used for projects that can best improve water quality at the lowest cost.

We studied a 34-mile stretch of the Mississippi River at St. Louis that included 18 major dischargers: 8 municipal treatment plants and 10 industrial plants. The Metropolitan St. Louis Sewer District operates two of the municipal plants (Lemay and Bissell Point), which account for about 60 percent of the major municipal and industrial discharges in the area and 90 percent of the area's total municipal discharges. Secondary treatment was planned at both plants.

Our analysis of river water quality data available at the St. Louis Sewer District indicated that, for most conventional water pollution standards (such as dissolved oxygen and suspended solids), secondary treatment would improve water quality only minimally. For example, a large amount of fecal coliform is discharged in the St. Louis area. However, reducing this pollutant through secondary treatment is not expected to have any measurable effect on public health or water supply operations in the Mississippi River. Overall, secondary treatment would not help improve river water uses significantly.

Officials of the St. Louis Sewer District, the States of Missouri and Illinois, and two EPA regional offices agreed that upgrading the Lemay and Bissell Point plants from primary to secondary treatment would not measurably improve the river's quality or change the river's uses. They based their opinions on the fact that the Mississippi has a large assimilative capacity.

In addition to the $163 million in Federal funds to be spent on installing secondary treatment facilities, large increases in energy use and large accumulations of sludge from secondary treatment operations were expected. These important factors would have an impact not only on energy and environmental issues but also on St. Louis area residents, who would have to bear the increased operation and maintenance costs. St. Louis district officials estimated that these costs would more than double.

Missouri and Illinois officials believed more benefits would result if Federal funds were used for other projects in their States. St. Louis sewer district officials told us that projects for combined sewer problems would be more beneficial than secondary treatment projects. However, since the Clean Water Act requires providing secondary treatment of discharges to freshwater, the State of Missouri must fund the St. Louis area projects before it can finance other pollution control projects, even though these projects may have greater potential for improving the water quality and use of streams.

To provide flexibility and reduce wastewater construction grant costs, we recommended that:

> "The Congress amend the law to eliminate the mandatory requirement for secondary treatment of discharges to freshwater and to permit the Administrator of the Environmental Protection Agency to grant waivers, deferrals, or modifications to this requirement when dischargers can demonstrate that the environmental impact of secondary treatment will be minimal or insignificant."

EPA response and our evaluation

In its August 18, 1978, reply to the House Committee on Government Operations and the Senate Committee on Governmental Affairs, EPA stated that its major objection to our proposed amendment is that the need for uniformly applied, technology-based wasteswater treatment standards on a national basis is grounded in the principles of the Federal Water Pollution Control Act Amendments of 1972. EPA also said that our review in the St. Louis area was not sufficient to support recommendations on a national basis.

We believe the Congress intentionally required uniformly applied, technology-based standards and measurable and enforceable national goals, including secondary treatment, because this approach is generally equitable and can be administered efficiently. However, this approach requires Federal expenditures for some treatment plants that do not help achieve the principal goal of the Clean Water Act--improved water quality. In recommending that the Congress amend the act to remove the requirement for secondary treatment in those cases where it can be demonstrated that the proposed expenditure may not measurably improve water quality, we believe significant savings can be achieved.

Cost considerations should play a more important role in determining policy direction now than in the program's early days. According to EPA's 1980 Needs Survey, $120 billion will be required for wastewater needs by the year 2000, of which $29 billion is earmarked for secondary treatment. Considering EPA's recent annual funding rate of about $3.4 billion, and how inflation has eroded the dollar's purchasing power, the fewer dollars that will be available should be used for only those projects that can best improve water quality at the lowest cost. The administration's current plan to significantly reduce water pollution control funds in fiscal years 1981 and 1982 is based on the premise that only those projects that improve water quality to the greatest extent should be funded.

The Congress set a precedent for a secondary treatment waiver program when it amended the Clean Water Act to allow direct discharges through coastal outfalls. The coastal outfall waiver program is premised on the fact that the marine waters have an enormous assimilative capacity that can readily absorb primarily treated wastes without significant environmental damage. We see very close similarities between this waiver program and the waiver program we are suggesting.

EPA has argued that the St. Louis area example is not adequate to support a national policy change. Although our review was limited to one specific area, we believe other major bodies of water, such as the Missouri, Ohio, and Illinois Rivers, have large assimilative capacities. However, each secondary treatment plant would have to be evaluated on its own merits since each facility's circumstances might be different.

EPA also has argued that removing some toxics, bacteria, viruses, and dissolved organics is a secondary benefit of secondary treatment that should be considered. We do not believe this benefit justifies mandatory secondary treatment. During our review, regional EPA officials told us that secondary treatment would provide long-term benefits, such as reducing suspected carcinogens and other pollutants. The officials pointed out that secondary treatment would remove large quantities of suspended

solids that contain a variety of pollutants--some harmful and some not. EPA headquarters officials in both the Standards and Criteria and the Municipal Construction Divisions recently told us that EPA studies made since our report was issued showed that secondary treatment takes out a greater amount of toxics than was earlier believed. The officials cited an interim EPA report on pollutants in 20 publicly owned treatment works (POTWs) that concluded that secondary treatment was generally more effective than primary treatment in removing selected organic and metal pollutants.

We do not believe such statistics justify mandatory secondary treatment. The need for additional toxics removal beyond the primary level should be evaluated for each POTW and should consider many factors. For example, an EPA study that examined two POTWs reported that because a treatment plant received such small amounts of organic pollutants from nearby industries, the percent of removal could not be determined. Toxics data should be considered relative to the amount of pollutants coming into the plant, the designated use of the plant's receiving waters, and whether a reduction is necessary to meet EPA's criteria for pollutants.

Secondary treatment to remove toxics, persistent organics, and other pollutants cannot be justified when the effect on the conventional pollutants, such as fecal coliform and suspended solids, appears to be minimal and when the health benefits from such treatment are unknown or highly questionable. If toxics or other substances need to be removed, a process specifically intended for that purpose should be used, such as pretreatment of industrial wastes, in-plant industrial process changes, or enforcement of strict sewer ordinances.

EPA officials believe that substituting a case-by-case determination of effluent limitations for municipal facilities would result in the need for additional EPA personnel and resources. We realize that the administrative costs to review grantee requests for waivers, modifications, or deferrals could increase. We do not advocate setting up a system in which administrative costs are higher than the savings from waiving, modifying, or deferring secondary treatment projects. Undoubtedly, the costs and benefits of many proposed secondary treatment projects will not vary much. Our concern is not so much with projects that are marginally questionable as with projects whose costs far exceed the benefits to be realized. Accordingly, not all requests would have to be reviewed in detail. The savings from waiving, modifying, or deferring projects that are not cost beneficial would far outweigh the additional administrative costs.

ADVANCED WASTE TREATMENT REQUIREMENT

Our report entitled "Many Water Quality Standard Violations May Not Be Significant Enough To Justify Costly Preventive Actions"

(CED-80-86, July 2, 1980) concluded that costly advanced waste treatment facilities may be having little effect on improving water quality. States designate water uses, such as for drinking water or fishing, and limit pollution levels to protect the uses by setting water quality criteria. Mathematical models predict when the water quality criteria will not be met and water treatment is needed. It is very difficult, however, to properly designate water uses and set water quality standards, and mathematical models are often imprecise. Nevertheless, advanced waste treatment is required whenever a water quality standard is predicted to be violated, without regard to how significant the violation is or how much it would cost to build wastewater treatment plants. We recommended that the Congress seriously consider several alternatives to amending the Clean Water Act that would give EPA the flexibility to consider costs more closely in justifying advanced waste treatment projects.

Background

Our July 1980 report discussed EPA's administration of the advanced waste treatment (AWT) program. AWT facilities are estimated to cost $5.6 billion through the year 2000.

Each State has established uses it plans to make of its waterways and has developed water quality standards to protect such uses. The standards help determine the type of wastewater treatment needed to protect the uses. Predictions that water quality standards will be violated, thus necessitating advanced waste treatment, are generally based on mathematical models.

Based on our discussions with Federal and State water quality officials and consultants and our review of scientific studies on water quality, we concluded that AWT--with few exceptions--may not be justified because

--relating the impact of various treatment levels to water use is difficult,

--mathematical models used to predict water quality are often imprecise,

--EPA makes it difficult for States to relax or downgrade water quality standards, and

--Federal funding is insufficient to achieve water quality standards of all waterways within a reasonable time.

The Clean Water Act allows AWT plants to be built regardless of their environmental impact or cost. However, in 1979, the Appropriations Conference Committee stipulated that water pollution control funds could be used for AWT only if (1) the incremental

cost of the treatment was $1 million or less or (2) the EPA Administrator personally determined that advanced treatment was required and that it would definitely result in significant water quality and public health improvements.

During July 1978 hearings before the Subcommittee on Oversight and Review, House Committee on Public Works and Transportation, we and others pointed out a number of questionable AWT projects. In fiscal year 1979, the first year of the Appropriations Conference Committee restriction, EPA acted on 26 projects where AWT cost more than $1 million; EPA's regional administrators acted on 178 projects involving $1 million or less. These actions included approving an entire project as proposed, approving a portion of a project, or deferring all or a portion of a project.

Our review of nine projects that EPA acted on showed that, for most projects, EPA's review process did not indicate that AWT would definitely result in significant water quality and public health improvements.

We recommended to EPA a number of corrective measures to improve the process for setting and implementing water quality standards and to better assess the need for AWT. We further recommended that the Congress consider several alternatives that would give EPA the flexibility to consider costs more closely in justifying AWT projects. These alternatives included:

--Amending the Clean Water Act to require explicitly a cost/benefits review to show whether AWT will result in significant water quality or social or public health benefits before such projects can be funded. The amendment should leave the water quality standards review process intact but should ensure that AWT projects are reviewed rigorously before being funded. Thus, the act would only allow Federal funding for projects where benefits exceed costs.

--Amending the act to require the States to do a cost/benefits analysis of effluent limitations more stringent than those required by the act. If costs exceed benefits, the Federal Government should not fund AWT for those projects. States could still establish mandatory effluent limitations, but EPA would fund projects only where a cost/benefits analysis justified the need for such stringent limitations.

--Amending the act to declare a moratorium on AWT projects by withholding funding for wastewater treatment beyond secondary treatment until EPA can clearly show that ecological, social, and public health benefits are being realized by the various levels of treatment beyond secondary treatment. A number of AWT plants have been built and are operating. The Congress may want to have EPA

explicity show that ecological, social, and public health benefits are being realized now that such plants are on line and operating.

--Amending the act to eliminate the requirement for a margin of safety that compensates for the lack of knowledge concerning the relationship between effluent limitations and water quality. The amendment would also include language to require that all treatment beyond secondary treatment costing $1 million or more must produce significant ecological and social or public health improvements. This change of emphasis should promote wiser investments in AWT facilities.

EPA response and our evaluation

EPA agreed in general with many of our recommendations and is considering changes which would modify the Agency's water quality, waste load allocation, and AWT review processes.

On our overall conclusions, however, EPA did not generally agree. EPA said the conclusions reflected a misunderstanding of the legislative objectives and failed to recognize that States may legally set their own water quality standards.

We recognize that the Congress wanted to make "all" waters fishable and swimmable, but only "wherever attainable." Although the Congress did not require EPA to weigh benefits against the costs of building AWT, it did recognize that the fishable/swimmable goal was not attainable in all cases. In fact, EPA itself directs States to consider "environmental, technological, social, economic, and institutional factors" in determining attainability. Therefore, we continue to believe that costs should be considered in setting water quality standards and in determining the need for AWT.

The Congress has not acted on the alternatives we suggested for amending the Clean Water Act to allow for a cost/benefits approach to funding AWT projects. In view of the savings available from such an approach, we believe the congressional oversight committees should give strong consideration to the alternatives we presented.

COMBINED SEWER OVERFLOW PROJECTS

Our report entitled "Large Construction Projects To Correct Combined Sewer Overflows Are Too Costly" (CED-80-40, Dec. 28, 1979) concluded that neither the Federal Government nor local communities can supply the enormous amount of funds required for the large construction projects usually needed to stem pollution and flooding caused by combined storm sewer and sewage systems. EPA estimates that $37 billion is needed to curb pollution caused by sewer

overflows and $62 billion is needed to prevent flooding. We identified a number of new techniques--called "best management practices"--which offer promise and are far less expensive than the construction projects. We recommended actions by the Congress and EPA to encourage the use of these low-cost techniques.

In a six-volume report on a specific combined sewer overflow project entitled "Combined Sewer Flooding And Pollution--A National Problem. The Search For Solutions In Chicago" (CED-79-77, May 15, 1979), we discussed the merits of the Tunnel and Reservoir Plan. We questioned continuing the project because of its high cost (estimated at $11 billion by 1983) and its uncertain impact on water quality.

Background

In many U.S. cities, stormwater and wastewater flow through the same sewer systems. Heavy rains cause sewer overflows, polluting waterways and flooding streets and basements. Ten of the Nation's 20 largest cities have combined sewers. Further, of 15 major cities with combined sewer systems that we visited, less than half have started construction projects to solve their combined sewer problems, and for most that have, it is questionable whether projects underway will ever be completed. The same could also apply to hundreds of smaller communities with combined sewers.

Sufficient money for large-scale solutions to combined sewer problems is not forthcoming, and therefore a different approach must be taken. One promising concept, referred to as best management practices, involves examining and trying alternative techniques before embarking on large-scale, structural solutions. Although no individual technique provides the same degree of improvement offered by structural solutions, several techniques together could minimize overflows and reduce the size of construction projects if they are eventually needed.

Alternative techniques include:

--Measures to reduce the flow of rain or pollutants into the system, such as storing rainwater on rooftops, in grassy areas, or in parking lots; disconnecting downspouts; or keeping streets clean.

--Devices to increase the flow of sewage through the system, such as sewer inlet restrictors, remotely controlled regulators, and injections of chemicals to reduce friction.

--Devices to regulate and treat sewage at overflow points.

Many of these techniques have been effective in reducing pollution and/or flooding from combined sewers; however, they are

not widely used. As a general rule, they will not achieve the degree of improvement that can be expected from restructuring the system. Yet, they can provide relief at far less cost.

Perhaps the chief reason alternative solutions have been ignored is the inflexibility of national and State water quality goals. The desire to make waterways fit for fishing and swimming, as mandated by the Clean Water Act, often dictates a large-scale, structural solution as the only way to eliminate most pollution from overflows. More flexible water quality goals are needed to encourage the use of low-cost techniques.

Another obstacle to the use of alternative technology is EPA's position that the Clean Water Act provides that Federal grants are available only for construction-type projects, thus excluding many best management practices such as in-stream aeration, sewer cleaning, streetsweeping, creating ponds in parking lots, and disconnecting downspouts.

Furthermore, EPA has given combined sewer overflow abatement, when compared with treatment plants, a low priority. The Agency's rationale is that more and faster progress in cleaning up the Nation's waterways can be accomplished by concentrating efforts on constructing new or upgrading existing municipal treatment facilities to secondary treatment standards. Since the Agency estimates that at least $34 billion still needs to be spent on treatment plant construction or upgrading, it appears that the combined sewer problem will continue to receive low priority.

An additional problem, from the communities' perspective, is the absence of Federal involvement in solving flooding problems caused by combined sewers. While EPA can fund projects to correct combined sewer pollution problems, it cannot become involved in flooding problems caused by the same system. Likewise, the U.S. Army Corps of Engineers, the agency traditionally involved in flood control projects, is prohibited by the Office of Management and Budget from funding projects to prevent flooding by combined sewers. Community officials point out that both flooding and pollution are caused by the same system and devising separate solutions is inefficient.

We recommended that the Congress amend the Clean Water Act to

--allow for increased flexibility in meeting water quality goals in those cases where it is determined that the cost to achieve such goals is prohibitive;

--allow EPA to fund lower cost, nonstructural, or limited structural techniques that cannot be funded under current

legislation and that are not normally considered operating and maintenance costs; and

--permit Federal funding of flood projects when (1) the flooding is caused by combined sewer systems and (2) the solution is part of a total approach designed to minimize both pollution and flooding in the combined system.

We also recommended that the EPA Administrator:

--Mount a vigorous program of promoting less costly solutions and educating architect/engineering firms, States, communities, and the public on the need for them.

--Require that communities adopt a lower cost approach, including maximum use of innovative and alternative techniques, before funds will be granted for costly structural solutions.

--Develop guidelines outlining an approach that should be followed in combating the combined sewer problem. Such guidelines should, among other things, emphasize best management practices and provide comprehensive guidelines for using alternative techniques.

--Speed the transition of proven new technology from the research and development stage to the construction grant stage.

EPA response and our evaluation

EPA generally agreed with the thrust of the report and its recommendations and has taken or promised actions on our report recommendations. However, EPA does not agree with the third recommendation to the Congress about permitting Federal funding of flood projects under certain conditions.

EPA officials commented that they felt that the current Federal policy of no EPA involvement in flooding is correct and that urban flooding should be considered a local problem. EPA officials further stated that, if they got involved in urban flooding, the large costs associated with that problem would dilute the limited funds available to fight water pollution.

We agree that EPA involvement in flooding would dilute available Federal funds, but we believe that it is more efficient to design a single project that attacks both the pollution and flooding problems caused by combined sewer systems. Thus, while we are sympathetic to EPA's concerns, we believe that in the long run the Nation would be better served by a policy that would help communities attack both flooding and pollution caused by combined sewers with a single project.

The Congress did not act on our recommendations to amend the Clean Water Act. Because the best management practice technique provides a low-cost alternative to the pollution and flooding problems in our major cities, we believe the congressional oversight committees should give strong consideration to our recommendations.

CHLORINATION REQUIREMENT

Our report entitled "Unnecessary and Harmful Levels of Domestic Sewage Chlorination Should Be Stopped" (CED-77-108, Aug. 30, 1977) discussed the need for further changes to limit chlorination in our Nation's waters.

Chlorine use has been found harmful to aquatic life. In 1976, EPA removed a bacterial limitation from its definition of secondary treatment, a limitation that effectively required the year-round use of chlorine. However, many States still require chlorine use because they are uncertain whether EPA's change will affect the States' ability to meet the congressionally mandated 1983 swimmable goal. We recommended an amendment to the Clean Water Act to permit exceptions to the national goal and also recommended that EPA revise its water quality criteria for fecal coliform bacteria (chlorine reduces this bacteria level) to recognize seasonal variations.

Background

Sewage is chlorinated primarily to prevent the transmission of waterborne diseases by destroying the disease-causing bacteria and viruses. The need for sewage chlorination is not universally agreed upon by public health officials. Unnecessary chlorination wastes energy and is also expensive. We estimated that the cost of the 200,000 tons of chlorine used for sewage disinfection in 1976 was $40 million.

Chlorine is also found in industrial discharges. Electric powerplants are estimated to add about 100,000 tons of chlorine chemicals to cooling water each year to control slime films.

Chlorine discharges by municipal sewage treatment plants in the United States sometimes exceed levels that are safe for the aquatic environment; fish kills and water-life deterioration have resulted. Chlorine discharges, even at low levels--roughly equivalent to a quart of laundry bleach in 2 million gallons of water--have been shown to harm fish and other water life.

Municipal sewage treatment plant operators follow a widespread practice of disinfecting wastewater because it has been generally believed to protect the public health from diseases transmitted through water. However, with the possible exception

of chlorine needed to protect areas of shellfish harvesting or of unrestricted irrigation with sewage wastes, the public health benefits from chlorinating sewage are minimal.

The sewage chlorination practice is questionable because:

--The relatively few incidents of disease transmitted through water in the United States generally are not serious and are almost always transmitted through inadequately treated drinking water.

--Sewage disinfection is not practiced extensively in other industrialized countries with public health experiences similar to those in the United States.

--Widespread sewage disinfection is a relatively recent phenomenon in the United States, with little accompanying improvement in public health. The Center for Disease Control has taken the official position that disinfection of sewage provides little public health benefit.

--Epidemiological studies attempting to relate bacterial levels in swimming waters with levels of illness have been inconclusive.

EPA's 1973 definition of secondary treatment of sewage included a bacterial limitation because EPA believed that discharges below the limitation would minimize the spread of disease. The limitation virtually required the use of chlorine in most sewage treatment facilities. In July 1976 EPA removed the limitation because of (1) the toxic effect of chlorinated discharges on aquatic life, (2) its concern about the public health effects of chlorinated organics, (3) the cost of chlorine, (4) and the energy needed to produce it. States now do not have to disinfect waste treatment plants' effluent, unless such treatment is needed to meet the States' water quality standards. States can stop some chlorination if they consider it unnecessary. For example, States can stop chlorination for discharges into dry stream beds and discharges during cold weather.

Even though the July 1976 change no longer requires a minimum disinfection level and allows States to determine the conditions under which they will use chlorine for disinfection, the change has had only a limited impact in reducing unnecessary chlorination. Officials of 25 of the States we contacted in 1977 stated that they did not plan to reduce their chlorination requirements, even with EPA's change. Many cold-weather States, including Alaska and Wisconsin, require continuous year-round sewage chlorination, with no reductions permitted during cold-weather months.

In addition, the Agency's water quality bacterial criteria of July 1976 includes the same bacterial levels for swimmable waters as the secondary treatment levels did. EPA did not consider limiting the bacteria criteria for swimming to certain times of the year. Since the Clean Water Act established as a national goal that, whenever attainable, all waters be swimmable, including a bacterial limitation in water quality criteria for swimming waters will essentially reestablish universal, year-round sewage chlorination.

To reduce unnecessary chlorination of sewage, we recommended that the Congress amend the Clean Water Act to permit exceptions to the national goal of swimmable waters to recognize those situations in which waters are determined to be unswimmable because of other factors, such as heavy barge traffic, cold seasons of the year, and general appearance. We also recommended that the EPA Administrator (1) revise EPA's water quality criteria regarding the bacteria standard for swimming waters to recognize seasonal variations and (2) specifically delineate those circumstances in which sewage chlorination is or is not needed to protect the public health.

EPA response and our evaluation

EPA disagreed with the recommendation to the Congress because it believes an amendment is not necessary to achieve the objective of the recommendation. EPA believes that its regulations allow standards to be set at levels less stringent than the national water quality goals of fishable/swimmable waters when certain prescribed conditions are met and points to the fact that it allows seasonal chlorination when the possibility of human contact is remote.

Although EPA's regulations allow the States to ease sewage chlorination requirements, many States that do not appear to need chlorination still have not changed their chlorination requirements. State officials told us that EPA has historically made it very difficult to receive an exemption from any water quality standard and has required stringent documentation to justify an exemption. States have found it an expensive and often fruitless exercise to meet the Agency's "certain prescribed conditions" clause.

While EPA Criteria and Standard Division officials agreed that in the past the Agency required comprehensive justification for water quality standard downgrades, they cited a draft document that expresses the need to liberalize EPA's policy in this area. They said that EPA will be placing greater consideration on economic factors in the future and as a result, States could find it easier to downgrade standards such as the one for fecal coliform.

Even though EPA has moved toward changing its documentation requirements and has plans to revise its water quality criteria in line with our recommendation, the Agency has not placed a very high priority on the chlorination issue. For example, an EPA criteria branch official told us that EPA does not plan to revise its fecal coliform water quality criteria until late 1981. He also said that the Agency does notify each State, during EPA's 3-year review cycle of State standards, that the States can institute a seasonal variation policy for chlorination. We believe our report justified more immediate and timely action on EPA's part to change the States' chlorination policies.

We also believe that the congressional oversight committees should consider our recommendation to amend the Clean Water Act so that EPA has a clear mandate on chlorination which the States can use to change their policies. The oversight committees may also wish to question EPA during hearings about EPA's lack of attention to the chlorination issue.

SAVINGS AVAILABLE IF RECOMMENDATIONS ARE IMPLEMENTED ON HAZARDOUS AND SOLID WASTE PROGRAMS

HAZARDOUS WASTE PROGRAM

Our report entitled "Hazardous Waste Management Programs Will Not Be Effective: Greater Efforts Are Needed" (CED-79-14 Jan. 23, 1979) showed that neither EPA nor the States had the staff and funds to operate and manage programs effectively to control hazardous waste disposal. The Congress only provided EPA with limited funds for State program implementation. Many States acknowledged that without such assistance they could not accept responsibility for implementing the Resource Conservation and Recovery Act as the Congress directed. In such cases, EPA must operate State hazardous waste programs. Self-supporting programs that encompass fee systems would encourage the States to accept their program responsibilities and reduce State dependence on Federal funding. They would also eliminate the need for Federal as well as State general revenue support for hazardous waste programs. In cases where EPA would be required to operate State hazardous waste programs, fee systems could be used to underwrite EPA program costs. While acknowledging the validity of the fee concept to operate hazardous waste programs, EPA has not aggressively pursued its implementation.

Background

Our January 1979 report evaluated the resources needed to effectively implement State hazardous waste management programs under subtitle C of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (RCRA) (42 U.S.C. 6901).

The Congress intended that RCRA would provide "cradle to grave" regulation of hazardous wastes. It also believed that RCRA should, if properly carried out, prevent improper disposal of future hazardous waste. The act charged EPA with implementing and administering the hazardous waste program, including developing a regulatory framework to identify hazardous waste and properly manage its disposal.

Hazardous waste sources are numerous and widely scattered throughout the Nation. They include industrial production, agricultural chemical residues, chemical or pathological wastes from institutions such as hospitals and laboratories, and wastes from Federal Government activities. Wastes come in many forms--solids, powders, sludges, slurries, or liquids. About 90 percent are liquid or semiliquid, including such substances as acids, flammables, explosives, disease-causing wastes, and toxic chemicals such as arsenic, cyanide, DDT, and PCBs.

In the summer of 1978, the noxious chemicals of Love Canal brought the hazardous waste issue into public view. During the nearly 3 years since then, similar episodes of varying degrees of severity have occurred in every State. In many instances, chronic adverse effects on human health or the environment have resulted.

The problem's dimensions are far reaching. EPA estimates that 762,000 American businesses generate an estimated 57 million metric tons of hazardous waste each year. More than 60 percent of these wastes originate from industrial sources such as chemical firms. EPA expects hazardous waste generation to increase from 4 to 6 percent each year.

Most of the 26 States we visited or contacted did not know the volumes of hazardous waste being produced in their jurisdictions and had virtually no information as to how they were being disposed of. Also, none of the 26 States had fully identified hazardous waste generators in their areas or believed they had adequate enforcement programs for the limited controls that existed.

EPA had been unable to obtain the funding authorized for carrying out hazardous waste disposal programs, and the financial and technical assistance promised to the States had not been provided. Many States said that they would not accept responsibility for carrying the RCRA requirements without such assistance.

We concluded that no long-term funding sources were available for hazardous waste programs from the Federal, State, and local levels. In examining possible solutions to the funding problem, we evaluated the fee system programs which charge for waste disposal and provide an alternative source to supplement existing funds and a means of long-term program support.

We recommended that the EPA Administrator:

--Encourage State governments and agencies to develop self-supporting funding methods, such as fee systems, for operating and carrying out hazardous waste management programs within their jurisdictions.

--Develop model legislation for the establishment of fee systems for use by States in obtaining the necessary authorizations from their legislatures.

--Request that RCRA be amended to allow EPA to include a fee system to cover hazardous waste program costs where (1) a State cannot or will not assume responsibility for its program and (2) the Agency is required by the act to assume responsibility for the State's program.

EPA response and our evaluation

On December 11, 1980, the President signed Public Law 96-510, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, commonly referred to as "superfund." The act provides for a revolving fund that would allow the Federal Government to go in and clean up hazardous waste sites, then try to recover the costs of such cleanup later from the responsible parties. The $1.6 billion fund will be established over the next 5 years by a tax on petroleum and certain chemicals to provide 86-1/4 percent of the fund with the remaining 13-3/4 percent provided by Federal appropriations. The superfund will cover cleanup and response actions for the most immediately threatening conditions that currently exist at such dump sites as Love Canal in Niagara, New York.

However, the problems of hazardous waste programs go far beyond cleanup of the sites that present an imminent and substantial danger to health and welfare. Tens of thousands of closed dump sites currently exist that, though not immediately threatening, should also be acted upon. In addition, the Federal Government and the States need increased funding for general program administration and support if hazardous waste programs are to be effective in the years ahead. Without continued program support at the Federal level, as well as the State level, the likelihood of effective RCRA hazardous waste programs is very much in doubt.

EPA acknowledges the fee concept as a way to confront the funding needs of hazardous waste management programs and believes the Congress should give this matter its special attention. In the current period, where Federal financial involvement in many programs is declining, a fee system program offers an alternative by requiring the disposers causing the problem to help pay for its solution. As an alternative financing arrangement, we believe the fee system concept deserves consideration by the Congress in the conduct of hazardous waste program operations and cleanup.

CODISPOSAL OF GARBAGE AND SEWAGE SLUDGE

Our report entitled "Codisposal of Garbage and Sewage Sludge--A Promising Solution to Two Problems" (CED-79-59, May 16, 1979) described the growing problems of disposing of increased quantities of sewage sludge and garbage. Combined disposal, or codisposal, of sludge and garbage by burning is a logical solution. Although more data based on operating experience is needed, some forms of codisposal appear environmentally safe and economically sound.

Many factors, including institutional and financing problems have tended to limit codisposal in the United States. We recommended that EPA encourage and facilitate more widespread consideration of codisposal.

Background

Disposing of the increasing quantities of garbage (municipal solid waste, refuse, or trash, excluding agricultural, industrial, and construction wastes) and municipal sewage sludge economically and in an environmentally safe manner has become a major problem in many parts of the country. EPA estimated that in 1975 Americans generated 136 million tons of garbage, or about 3.4 pounds per person daily. The total will increase to about 225 million tons by 1990. These estimates include residential and commercial wastes which are typically the major portion of municipal collections.

Sewage sludge is the residue containing the solid matter extracted from municipal wastewater during treatment. Before sludge is subjected to processing, it is 95 to 98 percent water. The composition of sludge also varies, depending on the treatment process used and the type of wastewater treated. Although sludge is primarily organic and contains varying amounts of nutrients, it may contain disease-causing bacteria and toxic substances, such as pesticides and heavy metals. Currently, about 5 million dry tons of sludge are produced a year. This amount is expected to double by 1987 as the level of wastewater treatment is upgraded and more treatment plants become operative.

State and local governments have the primary responsibility for disposing of garbage and sludge; the private sector also plays an important role. Waste disposal problems have, however, become national in scope. Consequently, the level of Federal involvement has increased. RCRA and the Clean Water Act are the primary statutes affecting sludge and garbage disposal.

We defined codisposal as the integrated processing of sewage sludge and garbage through burning, in which (1) garbage is used as a fuel in sludge drying and (2) the volume of both wastes requiring ultimate disposal is greatly reduced. Codisposal of sludge and garbage can be accomplished through various techniques, including thermal and biological processes. Our report focused on codisposal through thermal processes, such as co-incineration and copyrolysis (waste decomposition through heating in an oxygen-starved or oxygen-free environment) since these techniques can significantly reduce the volume of waste requiring final disposal while conserving or creating energy. Further, certain thermal technologies have been proven effective and are applicable in the United States, particularly when there are restrictions on existing disposal options, such as the sludge ocean dumping ban, which begins on January 1, 1982.

Unfortunately, the absence of cost data and the potential for significant differences in sites make it difficult to draw overall conclusions regarding the cost effectiveness of codisposal.

Our review of numerous studies and cost projections, however, showed that thermal codisposal is economically viable and can actually be less expensive in terms of total costs per ton than certain forms of separate garbage and sludge disposal. Generally, codisposal has significantly lower operating, maintenance, and energy costs than the separate techniques.

Thermal codisposal is, however, capital intensive. As a result, the availability of Federal construction funds may determine whether codisposal will be considered seriously. A confusing funding policy under EPA's water pollution control program, the primary Federal funding mechanism, has somewhat discouraged implementing of codisposal.

To expedite consideration and implementation of codisposal, we recommended that the EPA Administrator encourage and facilitate consideration of codisposal as an alternative waste disposal process by

--requiring that planned Agency evaluations of codisposal projects provide for developing and disseminating actual operating cost data that cognizant officials can use in evaluating disposal options;

--establishing a construction grants funding policy which, to the extent allowed under the existing legislative authority, would provide at least the same level of funding for deserving codisposal projects as for single-purpose, sludge-only disposal options; and

--requiring that States and local communities consider codisposal technology as a possible alternative during the areawide and facilities planning process and as part of RCRA planning activities.

EPA response and our evaluation

EPA acknowledged the validity of the recommendations but has not yet implemented them. One problem is that the recommendations cover aspects of two separate EPA program areas--water and solid hazardous waste--two organizationally separate activities within EPA.

We believe that EPA's inability to resolve this inaction requires special attention by the Congress in view of the cost savings and environmental advantages that our recommendations offer.

(089158)

AN EQUAL OPPORTUNITY EMPLOYER

UNITED STATES
GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES PAID
U. S. GENERAL ACCOUNTING OFFICE

THIRD CLASS